This is a continuation of 09/528,262, filed 3/17/2000.

3/06

MULTI ELEMENT, MULTI COLOR SOLID STATE LED/LASER

The following application is a utility application for provisional application number 60/166,444 to Denbaars et al., which was filed on November 19, 1999.

BACKGROUND OF THE INVENTION

Field of the Invention

This invention relates to solid state light emitting diodes (LEDs) and lasers that can emit various colors of light, including white.

Description of the Related Art

Light emitting diodes (LEDs) are an important class of solid state devices that convert electric energy to light. They generally comprise one or more active layers of semiconductor material sandwiched between oppositely doped layers. When a bias is applied across the doped layers, holes and electrons are injected into the active layer where they recombine to generate light. Light is emitted omnidirectionally from the active layer and from all surfaces of the LED. The useful light is generally emitted in the direction of the LED's top surface, which is usually p-type.

One disadvantage of conventional LEDs is that they cannot generate white light from their active layers. One way to produce white light from conventional LEDs is to combine different colors from different LEDs. For example, the light from red, green and blue LEDs, or blue and yellow LEDs can be combined to produce white light. One disadvantage of this approach is that it requires the use of multiple LEDs to produce a single color of light, increasing costs. In addition, different colors of light are often generated from different types of LEDs which can